

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Applicant: Michael Meyrick Burrell and  
Keith Stuart Blundy

Serial No.: 628,216

Filed: December 17, 1990

Art Unit: 1804

For: MODIFICATION OF PLANT METABOLISM

Examiner: D. Fox

DECLARATION UNDER RULE 37 CFR 1.132

I, Thomas ap Rees of The Elms, High Street, Little Eversden, Cambridge, England, DO SOLEMNLY and SINCERELY DECLARE as follows:

1. I am Professor of Botany, Department of Plant Sciences, University of Cambridge, Cambridge, England.
2. I am the T. ap Rees named as senior author in an article entitled "Effects of Low Temperature on the Respiratory Metabolism of Carbohydrates by Plants" published by the Symposium of the Society for Experimental Biology, Volume 42, pages 377-393, 1988; and named also as an author in eighteen of the references listed on pages 392/3 of said article.
3. I understand that the said article has been cited by the United States Patent and Trade Mark Office in connection with Patent Application S.N. 628,216 by M.M. Burrell *et al.*

4. I have read and understand the specification, claims and drawings of U.S. S.N. 628,216.
5. The said article presents compelling evidence that in respect of potato the lowering of temperature affects the metabolism of hexose phosphates differentially by restricting their entry into respiration and promoting their conversion to sucrose. The said article presents strong evidence that this results from the fact that at low temperatures the cold-lability of phosphofructokinase ("PFK") leads to a greater reduction in glycolysis (a component step of respiration) than in other pathways that consume hexose 6-phosphates. There is thus an increased availability of hexose 6-phosphates to such other pathways, whereby there is an increased synthesis of sucrose.
6. The said article further discloses that in a potato clone designated 13737 the PFK was of comparatively low cold-lability and that 13737 did not exhibit appreciable sweetening at low temperatures.
7. It is also a teaching of the said article that none of the four forms of PFK from 13737 was anything like as cold-labile as three of the four forms of PFK from potato variety Record.
8. It is thus a teaching of said article that a low level of sweetening of potato at low temperature is exhibited if the PFK of the potato is of a particular character, i.e. if the four forms of the PFK are of predominantly low cold-lability.
9. Said article is devoid of a teaching, explicit or implicit, that for a potato variety which normally exhibits a high level of sweetening at low

temperature, a low level of sweetening at low temperature will be exhibited if the potatoes of the variety are transformed with a sequence coding for PFK (even cold-labile PFK), so that additional PFK is present in the potatoes. Moreover, such concept was in no way pointed to by said article when read in the light of the common general knowledge possessed by one ordinarily skilled in the art in December 1989.

10. Prior to learning of the invention the subject of U.S. S.N. 628,216, I would have expected that the introduction of additional PFK into a plant would have been likely to be detrimental to the health of the plant.
11. When the said invention was made known to me I was surprised that it was effective in the obtainment of a low level of sweetening at low temperatures and that there was no detrimental effect on plant health.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardise the validity of the application or any patent issuing thereon.

Signature: Thomas J. Hies

Date: 15 Dec 92

SIGNED/EXECUTED IN MY PRESENCE THIS  
15<sup>th</sup> DAY OF December 1992